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M-TRAC

for rail safety



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SEEKING A SAFE CORRIDOR

PROTECTING TORONTO'S FUTURE

Determinants in resolving the dangers and risks associated with the haulage of explosive and toxic chemicals by rail through the high-density Toronto area.

November 30, 1986.

M-TRAC is a non-profit Metrowide umbrella organization of ratepayers, residents and other groups who following the Mississauga train derailment joined forces to investigate and advocate rail safety in densely populated urban areas. Members are committed to initiate legislative and other changes necessary to ensure public safety particularly in the transport of dangerous commodities by rail.

We gratefully acknowledge contributions from individuals, groups, municipalities and the Province of Ontario whose support made this and other reports and submissions possible.

M-TRAC

for rail safety

METRO TORONTO RESIDENTS' ACTION COMMITTEE

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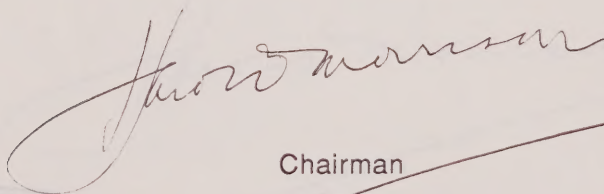
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November 30, 1986

TO THE CHAIRMAN AND MEMBERS
CITY SERVICES COMMITTEE
CITY HALL
TORONTO

We are pleased to transmit to you the response of the M-TRAC organization to the report by Philip E. Wade Associates entitled A Strategic Overview Hazardous Goods Transportation by Rail in Toronto, presented by the City of Toronto Planning and Development Department.

Yours sincerely,



Chairman



TO THE CHAIRMAN AND MEMBERS
CITY SERVICES COMMITTEE
CITY HALL
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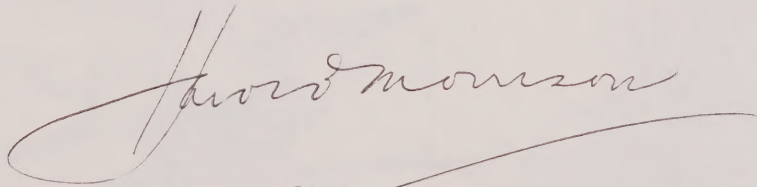
November 30, 1986

Mr. Harold F. Gilbert
Chairman
Toronto Area Dangerous Goods
Rail Task Force
4900 Yonge Street
Suite 200
Willowdale, Ontario
M2N 6A5

Dear Mr. Gilbert:


We are pleased to transmit herewith the views of the M-TRAC organization on matters relating to the safety of transporting dangerous goods by rail through the high-density area of Toronto.

Yours sincerely,



Chairman





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"WHAT I AM CONFRONTING HERE IS THE HEALTH AND SAFETY OF CANADIAN CITIZENS IN THE FACE OF AN EVER-INCREASING FLOW OF DANGEROUS TRAFFIC ON THE RAILWAYS OF CANADA."

-- John Magee, Chairman (retired)
Railway Transport Committee
Report of the MacMillan Yard
Inquiry 1985.

* * *

"THE ADOPTION OF A POLICY OF KEEPING POPULATION AT RESPECTABLE DISTANCES FROM RAIL LINES WHERE DANGEROUS COMMODITIES ARE BEING TRANSPORTED IN LARGE QUANTITIES NEEDS TO BE ADDRESSED, BUT IT IS MUCH TOO LATE FOR SUCH A POLICY TO HAVE RAPID OR SIGNIFICANT EFFECT IN THOSE AREAS WHERE DENSE POPULATIONS ARE ALREADY FOUND. UNLESS SOME ACTION IS TAKEN, THE RISK FACTORS WILL CONTINUE TO INCREASE AND POTENTIAL FOR CATASTROPHE THAT ALREADY EXISTS WILL BECOME STEADILY GREATER."

-- Ian Burton and Keith Post,
The Transport of Dangerous
Commodities by Rail in the
Toronto Census Metropolitan
Area: A Preliminary Assessment
of Risk.
May 1983.

* * *

VAPOUR CLOUD EXPLOSION

"IN THE CASE OF THIS TYPE OF ACCIDENT, HEAT RADIATION WOULD BE THE MAIN CAUSE OF DEATH AND INJURY. DEPENDING UPON THE SEASON AND TIME OF DAY, MANY OF THESE PERSONS WOULD BE PROTECTED FROM RADIATION EFFECTS IF INDOORS. IN ANY EVENT, IT WOULD BE A DISASTER OF SIGNIFICANT PROPORTIONS RESULTING IN MUCH DEATH AND DESTRUCTION."

-- Philip E. Wade Associates,
A Strategic Overview
Hazardous Goods Transportation by Rail in Toronto.
November 1986.

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- B — EVACUATION DIFFICULTIES PRESENTED
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- D — DENSITY OF SCHOOLS IDENTIFIED

I. INTRODUCTION

Over the years a number of studies have pinpointed and exposed the extent of the threat which faces large numbers of people in the City of Toronto.

Toxic and explosive chemicals are associated with consumer and industrial needs. They must be transported from place to place and by and large their transport by rail is probably the cheapest and most efficient means possible.

But one railway, Canadian Pacific, has chosen to haul these very dangerous products on a double-tracked line running through downtown Toronto, through the busiest and most crowded area in all Canada. IN 1979, an accident in Mississauga alerted the entire Metro region, and more particularly the City of Toronto, to the devastation that another such accident might cause.

There are two basic points in this problem. If, in fact, these loads of dangerous chemicals are required in their entirety for the City of Toronto--and, indeed, the City might not survive without them--there is little to be done except to make the transport as safe as possible and bear the risk.

But it may be an entirely different matter if, in fact, the railway company is simply using the heavily-populated downtown Toronto area as a cheap and convenient **railway bridge**, to haul these dangerous chemicals mainly from and to other cities.

The "Strategic Overview" of Toronto hazardous goods rail transport, produced by Philip E. Wade Associates for the Planning and Development Department, discloses that **80 per cent** of all dangerous goods which crosses Toronto boundaries is intended for delivery to areas and regions outside the Toronto area.

Day and night, large quantities of these dangerous chemicals cut through the downtown core, mostly contained in rail tank cars, though also packaged in barrels and in small steel containers set in a metal frame on flat cars, and destined for other cities.

In relation to total commodity traffic, dangerous goods occupies a small percentage, but the potential damage that can result from a dangerous-goods accident can be extremely expensive, in lives and property.

Again, the Philip Wade document makes this point clear. And it was made clear in 1983 in the Canadian Transport Commission study known as the Burton-Post Report. That report warned that the **potential for catastrophe** still exists.

There has been and continues to be argument as to how this **potential for catastrophe** should be treated. We have tended, in the City of Toronto, to put the issue through the wringer--to subject the issue to studies. And the studies have simply confirmed what was known before--the downtown Toronto core is being subjected to a threat which may turn into a disaster.

No amount of studies will by themselves make the threat disappear. With the possible exception of Vancouver, the risk in Toronto is probably more serious than anywhere in Canada. Taking population densities into consideration, it would be prudent course to give the Toronto situation prior consideration.

The problem is not easy to resolve and the Philip E. Wade report warns of the costs that may be involved. If, in fact, schools, subways, homes and institutions are threatened, can we expect the federal government to provide the financial resources for an equitable solution? Who created the risk? Certainly not the City of Toronto. The City of Toronto did not order the railway to run its trans-continental freight line through the high-density downtown core.

That authority and that responsibility rest within the federal jurisdiction. The risk which currently exists was in effect **imposed** on the people of Toronto. Whether local zoning and planning officers were responsible for the manner in which the City developed on both sides of the track may form part of the debate, but there can be no doubt of the jurisdiction and the authority which allowed the railway to create the risk.

Nevertheless, there probably is little to be achieved by quarrelling over the constitutional or jurisdictional issues. The problem exists and is confirmed in the document delivered by the Planning Department. This report suggests various solutions. All we can do at this stage is attempt to advise you which, in our view, may be more viable and more productive than others.

II. RISKS DEFINED

One of the most significant and perhaps alarming disclosures in the Wade Report, presented by the Planning Department, is that roughly one-half the population of the City of Toronto is exposed to the medium and high consequence zones.

That doesn't mean that the estimated 300,000 persons would all be exposed to a dangerous-goods incident at one time. At least, we can all hope that would not be the case, although in the 1979 Mississauga situation virtually the entire city had to be evacuated under very trying circumstances.

And if that accident had occurred just 20 minutes later, the heart of downtown Toronto could have been very seriously affected. As much as we try to turn away from considering that possibility, we cannot avoid it. The danger was there in 1979 and it remains there today. Certain steps have been taken since 1979 to make the track safer; to reduce speeds and therefore reduce train momentum; to improve rails and install axle scanners. We have come some distance since 1979 but unfortunately accidents still occur.

We had narrow escapes last winter when a series of derailments struck the country, including derailments north, east and west of Toronto. Federal investigators showed defects in rail wheels and raised questions about the axle scanners. Other investigations disclosed unreliable radio equipment, sloppiness in scheduling train crews without sufficient rest periods and the use of substandard steel in some rolling stock.

Wherever these problems emerge, some accidents are sure to follow. One problem may be inadequate federal inspection of trains. Another may be constant railway demands to economize. The railways want to cut staff; to replace the more expensive human labor by lower-priced mechanical and electronic devices and sometimes these devices malfunction.

A consequence of the economic forces is that train maintenance and inspection may suffer. And accidents may become more frequent. Compounding problems in Canada is the subzero winter weather when steel begins to act in a brittle mode leading to the possibility of brittle failure.

New steels are being tested in the United States but it may be years before they are used to improve the tank cars hauling dangerous goods. We must try to protect the people of Toronto within the confines of existing operational practices, hoping eventually that risks will be removed or reduced by rerouting of the dangerous products or relocation of the track which causes the most serious problem.

While we can reasonably conclude that not all of the 300,000 people in the consequence zones would be affected all at once, we must nevertheless consider that a large portion might be affected and require evacuation.

We believe Mr. Wade could have gone into the evacuation problem in more depth. We believe he should have consulted with Mr. Sam Cass and his staff in the Department of Roads and Traffic.

Indeed, looking at the make-up of the Wade study group, we are concerned that no one from the public at large was invited to participate nor were there any chemical engineers who might be able to define not only the immediate dangers of a toxic or explosive spill, but lasting dangers such as soil and water contamination. In the Livingston, La., derailment of 1982--which probably ranks with Mississauga in terms of explosions and fires--the contaminated soil that had to be removed was equivalent to a three-foot trench **20 miles long**.

More recently, the toxic cloud that formed over the Miamisburg, Ohio, derailment of July 1986, forced the evacuation of about 25,000

people, the largest rail evacuation in U.S. history. That product was white phosphorus, used in the production of rat poison. Despite the fast response by emergency response people, a number of casualties were reported.

Various consultants come up with different risk figures in any study of rail accident probabilities. The science of analysis is not very advanced and the offered conclusions must be mixed with personal knowledge and intuition.

One very experienced regional manager of the Canadian Transport Commission suggests that accident probability forecasts be cast aside and reliance placed instead on intuition and common sense.

Nevertheless, calculated probabilities of accidents provide a useful guide, within limitations. When a consultant tells you that a specific kind of exotic accident cannot happen more than once in a 1,000 years, you might conclude there is little to worry about. However, when he fails to tell you that the calculation warns you to give the matter the highest and most immediate attention, he may have inadvertently led you into false complacency.

We know that a problem exists in the downtown Toronto area. We know that unless some permanent action is taken to relieve the existing risks, people will suffer--whether the disaster comes this year or next. One consultant has advised the Canadian Transport Commission that the chance of a major occurrence in the Toronto area may come at least every 10 years. It is now seven years since Mississauga.

Our own view is that the size of the population that might be affected by any one occurrence could be more in the range of the Miamisburg total--about 25,000--rather than the Mississauga total of 225,000.

The problem is that no one can advise you where this incident may occur. If it occurs in a highly congested area, with a number of high rises occupied by senior citizens and handicapped people, then the difficulty of getting these people out of the danger zone in good time can turn into a crisis.

It is no good telling you that in the event of a vapour cloud spreading from a ruptured tank people will somehow be warned in time and will casually walk out of their homes or apartments and escape without harm.

Authorities will tell you that on average you have about 30 minutes to clear a danger zone in the event of a chemical spill. Can you clear schools, hospitals, 30-storey apartment buildings and congested subway stations in 30 minutes? It may be a case where you cannot even reach these people because of the smoke, flame and intense heat. Mr. Sam Cass has analyzed the situation and has concluded that in some cases there isn't a hope in hell of getting these people out. One experienced federal authority who has many years of training in chemical spills suggests it may be best to leave the people in high rises where they are. They may have better chance of survival at high levels of the building.

The suggestion that evacuation isn't much of a problem in downtown Toronto is therefore not accepted by the M-TRAC organization. We believe that in some areas, including subway stations, it is a very serious problem and sufficient to warrant steps to remove the rail transport of dangerous goods from the downtown area.

III. OPPORTUNITY FOR RELOCATION

Many people in Toronto are proud of their city. They see it becoming one of the finest cities in the world. But no major city, with an envious reputation, would allow a double-tracked transcontinental freight train carrying heavy loads of dangerous chemicals to bisect its busy downtown neighborhood.

It doesn't make sense. Here we have huge investments in homes, schools, institutions and commercial enterprise threatened by the possibility of another Mississauga derailment and instead of immediate action to eliminate the risks, we devote ourselves to studies and more studies.

Each of these studies tend to deliver the same message: **get that rail line out of the danger zone**. The message is repeated by the Wade study when it states at Page 224 that:

"...a prime objective of the Task Force's research should be to establish a long-term or permanent solution concerning public exposure to rail transport of dangerous commodities, possibly in the form of a protected rail freight corridor. A protected corridor should be of suitable width and/or contour to protect adjacent communities from DC (Dangerous Commodities) incidents."

That simply means rail relocation. The specific problem, as far as the downtown area is concerned, is the present location of the CP North Toronto Subdivision. Various estimates of the amount of dangerous goods carried on that line have been presented to the

public. One estimate places the volume as just two per cent of total traffic; another places the dangerous goods volume at four per cent; still another at seven per cent.

In our view the only applicable comparison is revenue traffic, which would place the dangerous goods volume at about seven per cent and somewhat higher when traffic in dangerous goods residues is included.

The pertinent question is this: Is it advisable to recommend spending large sums of money to relocate a line when only seven to nine per cent of this traffic involves dangerous goods?

Would it not be cheaper and easier just to reroute the dangerous goods on another line running beyond the City's boundaries? After all, if most of these toxic and explosive chemicals are produced outside of Toronto and destined for regions outside of Toronto, why should the people of Toronto bear all the burden of this risk?

On the face of it, this approach could be justified solely on the basis of natural justice and a fair sharing of dangers imposed on innocent bystanders. But it may not be morally justified.

We all know the dangers involved. There is no solution in dumping the dangerous goods on a high-density neighboring community. Indeed, such an attempt would be met by very strong resistance by the affected communities.

The only realistic solution is a permanent relocation of the track into a low-density area--a well-protected corridor in which zoning is rigidly controlled. To find such a corridor may not be easy. To pay for it may present even greater problems. We suggest that these are problems not to be resolved by the city of Toronto but by the federal jurisdiction and the Province of Ontario. It will be up to the City of Toronto to recommend a course of action to the Task Force established by the federal government. The idea of rail relocation is well established and has won endorsement by the Council of the Metro Toronto government. Other cities have moved in that direction. The Burton-Post Report recommended such a move for Toronto and the Wade Report adds strength to that recommendation.

IV. CONSEQUENCES OF RELOCATION

It may be easy to make recommendations and perhaps far more difficult to implement them. Recommendations for the relocation of the CP North Toronto Subdivision, or at least a portion of that line, must be related to what may transpire once the line is relocated. Will the risks associated with dangerous goods be shifted to trucks? And will there be a massive exodus of industry from the downtown Toronto area?

These issues undoubtedly will be assessed by the Toronto Area Rail Transportation of Dangerous Goods Advisory Council--the federal Task Force led by Mr. Harold Gilbert. The M-TRAC position is that, largely, dangerous goods should be transported primarily by rail. The trucking industry has made some inroads on the rail market but, by and large, bulk commodities, including dangerous goods, are moved mostly by rail.

What impresses us in the Philip Wade study is evidence that relatively few industries in the downtown Toronto area depend on the North Toronto Subdivision for their dangerous goods needs. Relocation of the line would not therefore unleash a fleet of trucks carrying dangerous goods through busy downtown roads.

The second point related to trucking is that most of the large owners of dangerous goods trucks have a fairly good safety record. There may be a few independent types which may require special attention but the chemical industry, for example, is quite proud of their

trucking record and this seems to be borne out by other evidence reported in our appendices.

Another factor is the growing trend in the rail industry toward intermodal traffic involving greater flexibility in truck-rail transport. Instead of the need of a rail siding at the factory or industrial warehouse, trucks can haul the product in a small tank surrounded by a rigid steel frame and a crane in the rail yard swings the load onto a rail flatcar. On arrival at the destination, the intermodal package is again switched to a truck trailer for conveyance to the factory warehouse.

Whatever system is used, it is unlikely that Toronto industry would suffer major disruption. The existing rail system can be retained as a branch line operation, although the land is so valuable it may turn out to be more beneficial for the railway to exercise redevelopment rights, while retaining rail routes to the Toronto terminal on the waterfront.

The Wade Report recommends that "Metropolitan Toronto, in co-operation with City authorities, prepare a plan for the safe operations of DC transport by truck in Toronto." Metro Council has already moved in that direction and has approved a policy position which includes recommendations by M-TRAC. This also appears in our appendices.

It is interesting to note that the chemical, rail and trucking industries also support the idea of dangerous-goods truck route studies. M-TRAC joined with their representatives earlier this year at the Risk Management Institute of the University of Waterloo and approved a number of recommendations including one urging provincial and municipal authorities to join with industry in studying the feasibility of implementing special dangerous-goods truck routes.

The Risk Management Institute seminar was a good avenue of approach on a number of fronts, including support for legislation to establish adequate buffer zones around transport routes and find ways of ensuring that such zones are not breached.

No one benefits from a major derailment or a major chemical spill. Zoning officers have as much responsibility in this matter as anyone else. It is no use establishing a buffer zone and swearing on

a stack of Bibles that it will never be breached only to discover that some new government or municipal council finds reason to nibble away at the restricted land use, thereby eventually defeating the purpose of the land controls.

In our particular municipality land is likely to become increasingly scarce. As population densities continue to increase, more and more pressure will be placed on the existing rail line in terms of adjacent construction. We now have some 23 schools along the North Toronto Subdivision. The very nub of the Toronto subway system at Hillcrest rests precariously close to the CP rail line. In the event of a major mishap many lives would be stake. We had hoped that Mr. Wade would have devoted a bit more attention to that particular area as well as to the over-all evacuation problem.

But in the end, the question that persists is the cost of relocation. The federal Task Force will undoubtedly provide some figures on costs of various alternatives.

For the City of Toronto, the principle that requires immediate attention involves the future of the people of Toronto. Is it more important to protect the lives and welfare of school children and senior citizens, homeowners and storekeepers, and many others or to place a screen on the problem and pretend that it will go away?

V. SHORT-TERM SOLUTIONS

Granted, rail relocation, or major rerouting, will take time. Even with the very best of intentions, authorities may take some years to acquire the land and build the track. What kind of protection can be provided to fill the gap?

Some steps have already been taken. CP Rail has agreed to reduce speeds on special dangerous and dangerous commodity traffic on a six-mile rail section from the diamond in West Toronto to Leaside in the east. This reduction applies only on full loads and not on dangerous goods residues. It would be helpful if these residues could also be included in the speed restrictions.

This agreement by CP Rail is only temporary. It expires in 1988. Undoubtedly the federal Task Force will make recommendations on speed and other matters if it finds these necessary. The Wade Report suggests that the City lean heavily on the Task Force for action on speeds and urge the Railway Transport Committee of the Canadian Transport Commission to implement the Task Force recommendations. By that time the powers of the Transport Commission may have changed and the matter will be more in the hands of the federal Minister of Transport.

We believe it will be helpful, that the City make clear its views to the Task Force as early as possible. We urge the City to make representations on dangerous goods residues which currently are transported through the City at high speeds like ordinary box cars.

It may also be helpful, as Mr. Wade suggests, that the City urge the Railway Transport Committee to find ways of eliminating through traffic in dangerous and special dangerous commodities, although Mr. Wade refers only to special dangerous goods. The sooner through traffic is halted the better it will be for the many thousands of Toronto people who may be at risk.

Other short-term ideas are offered by Mr. Wade but they either have already been addressed or their influence on rail safety may be minimal.

Finally, we can only stress that the City's emphasis should be on a permanent solution. Half-way measures may turn out to have only cosmetic value and the burden of a major catastrophe will fall heavily on those who had the opportunity to provide deterrence and failed to do so.

Relocation may appear a long way off but it may be the only realistic and substantial solution.

VI. RECOMMENDATIONS

1. The City of Toronto should urge the federal Task Force to endorse relocation of the CP North Toronto Subdivision.
2. Relocation should be sited to avoid additional risks to neighboring high-density areas.
3. The area selected for relocation should be protected against encroachment. The corridor should be controlled through provincial legislation.
4. If relocation is shown to be impracticable, all dangerous goods destined for regions outside Toronto should be rerouted to bypass the vulnerable high-density downtown area.
5. Tank cars containing residues of dangerous goods should be treated as part of the dangerous goods categories, unless these tank cars are purged.
6. To protect the people of Toronto through traffic in Dangerous Commodities should be halted immediately.
7. The Metro Toronto position on trucking related to dangerous goods should be supported, including proposals to use restricted roads and times of travel.





Sharbot Lake, Ont., Dec. 31, 1985
\$10-12 million pile-up and chemical spill (M-TRAC)

These Months of Shame

During the winter of 1985, 86 Canada experienced a string of rail accidents unprecedented in our time.

Almost every region and every province was hit, bringing huge material damage, human suffering and death. The financial toll, including potential liability, may well exceed \$100 million.

These were months of shame for a rail industry which boasts that it has the best safety record in all North America. Those who were maimed and those who died may not be able to appreciate that record. It is clear there are deficiencies in the rail industry, the lifeblood of our country.

It is not just a question of broken wheels, broken rails, faulty signalling and possibly inferior steel. There is more involved — rail operating practices and rail industry goals. And above all else, the question of responsibility and effectiveness of those in Ottawa entrusted with the task of ensuring the priority of rail safety.

Over the years M-TRAC has warned the authorities the system is tilted against the public. Too many accidents have occurred where, possibly, there might have been prevention had the authorities acted in time.

Now, Transport Minister Don Mazankowski has

promised remedial measures. But what will they mean if there is no real enforcement? And why is it taking the Minister so long to act?

A few years ago, in Opposition, Mr. Mazankowski accused his political predecessor of weakness, backing down when faced with rail opposition to proposed safety improvements. But then we must ask: has Mr. Mazankowski the courage to face up to the railways?

It is one thing to put on the appearance of action by announcing studies and inquiries. It is quite another to force the railways to shed deficiencies through parliamentary action and the threat of federal prosecution.

To be fair, the railways claim they are doing everything possible to make things safe. But evidence of sloppiness still abounds. And there is evidence that when it comes to laying out funds for safety, the railways tend to hold back.

The more attractive tendency is to add a few more cars to the train load, to add a bit more weight carried, to keep the wheels but longer, to push up speed tenance, to reduce manpower and spend big sums on television commercials telling Canadians how wonderfully the railways perform.



Thunder Bay, Ont., Jan. 28, 1986
23-car derailment (Canapress Chronicle-Journal)



Edmonton, Alta., Feb. 8, 1986
23 dead, 90 injured, \$100 million damage (Edmonton Sun)



Quebec City, P.Q., Feb. 15, 1986
42 injured in VIA and freight train crash (Canapress Le Soleil)



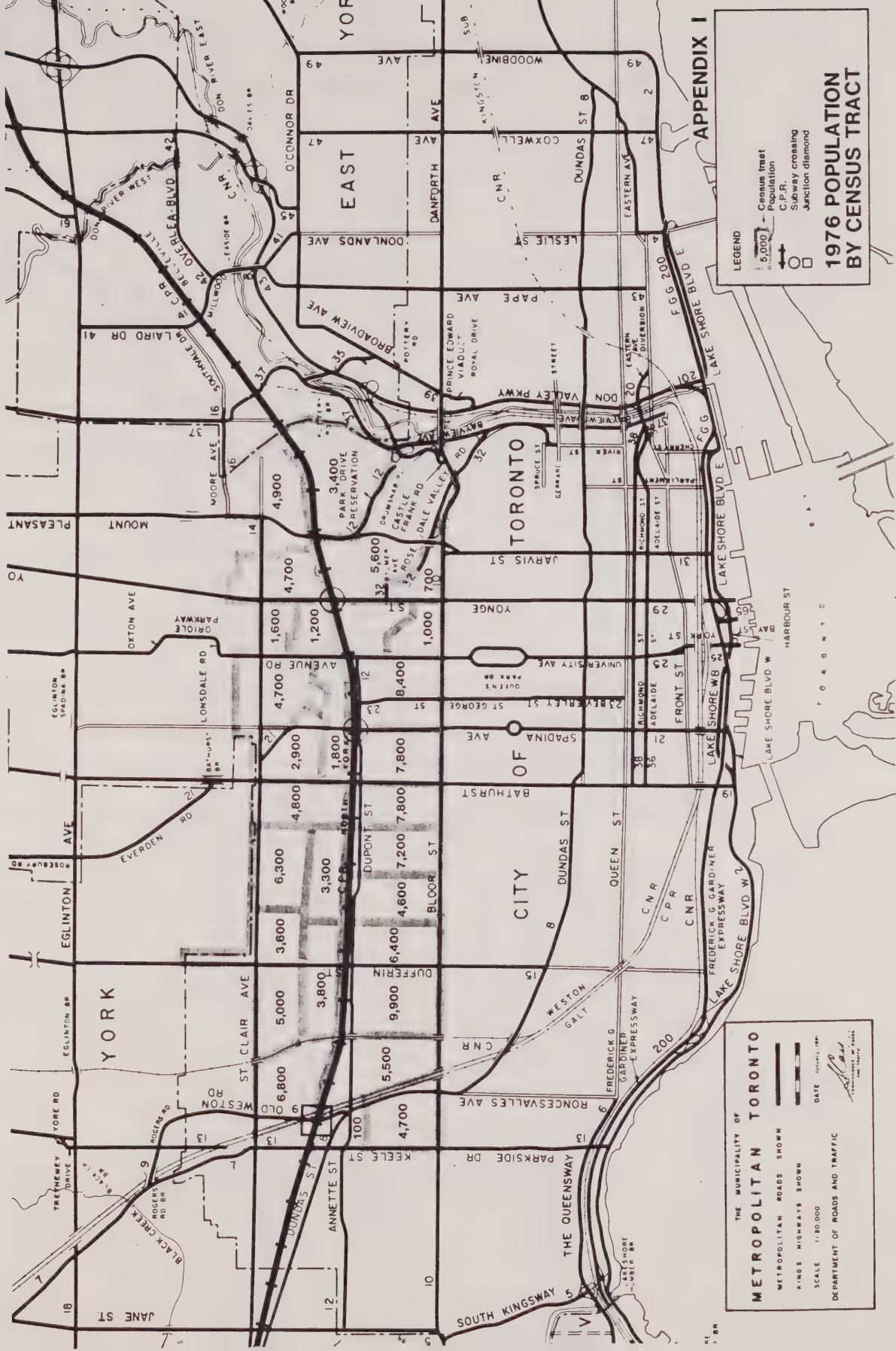
Parry Sound, Ont., Feb. 13, 1986
Sulphuric Acid spill in 15-car derailment (Sun)



Fort Langley, B.C., Feb. 16, 1986
Ethylene dichloride spill in 19-car derailment (Canapress)



Cambridge, Ont., Mar. 10, 1986
18-car derailment, over \$1.0 million damage (Canapress K-W Record)





THE MUNICIPALITY OF
METROPOLITAN TORONTO

METROPOLITAN ROADS SHOWN
 RING HIGHWAYS SHOWN

DATE January 1961
 SCALE 1:30,000
 DEPARTMENT OF ROADS AND TRAFFIC

[Signature]
 1961

LEGEND

— Road capacity, per direction
 (vehicles per hour)
 — Direction of traffic
 (2) Number of lanes
 C.P.R.
 — Subway crossing
 — Junction Diamond

ROAD CAPACITY

APPENDIX II



Transportation of Hazardous Materials



CONGRESS OF THE UNITED STATES
Office of Technology Assessment
Washington, D.C. 20540

loads of half of the 400,000 pound weight of the locomotive resting on the package.³⁴

OTA performed independent calculations that satisfactorily verified these analytical results.³⁵ Box 3E provides answers to some commonly raised questions about the casks.

The NRC cask certification process is of necessity painstaking and time-consuming. The safety record of NRC-certified casks, however, provides a degree of public confidence in the casks. The regulatory system governing the movement of radioactive materials has worked well. There have been no releases of radioactivity from the accidents involving spent nuclear fuel containers currently certified for transportation. Of the 2,552 packages for low-level radioactivity materials involved in accidents between 1971 and March 1985, only 67 were sufficiently damaged to cause releases. These packages are not required to contain the material in the event of an accident, and all releases involved low levels of activity that posed little threat to public health. (See table 3-6.)

Risk—Accident Probabilities and Consequences

An assessment of overall public risk must combine estimates of probability and consequence. Moreover, estimates of accident probabilities must include two factors: 1) the probability that any given vehicle carrying spent fuel will be in an accident, and 2) the probability that the spent fuel shipping cask will release any of its contents. The first of these is relatively easy to assess since a large amount of actuarial data about accident rates have been developed. Bureau of Motor Carrier Safety statistics show that accidents involving trucks occur once every 400,000 miles of travel, while rail statistics from the Federal Railroad Administration show that a rail accident occurs every 139,000 miles of travel. This translates into a probability of 2.5×10^{-6} truck accidents and 7.2×10^{-6} rail accidents per vehicle-mile.³⁶

For the second factor, likelihood of release, estimates must be used, since there is no significant actuarial record. A report from the Transportation Technology Center at Sandia National Laboratories estimates that fewer than 1 in 100 accidents would involve conditions severe enough to cause concern over a release of some contents of the cask.³⁷ This estimate appears consistent with analyses of the stresses involved in numerous actual highway and rail accidents of all types. The analyses show that real accident stresses do not exceed the test conditions in the regulatory standards in 99.5 and 99.9 percent of truck accidents involving impact and fire, respectively; as well as 99.6 and 99.9 percent of rail accidents involving impact and fire, respectively.³⁸ Thus, the overall probability of a truck or rail shipment of spent fuel being involved in an accident where conditions are sufficiently severe to cause some release of radioactive materials is less than 2.5×10^{-8} per vehicle-mile—or less than once for every 40 million miles of transport.

Table 3-7 shows estimates based on an OTA analysis of truck and rail accident rates in the year 2000. Current DOE estimates indicate that there are likely to be about 1,000 annual shipments from commercial reactors to a storage site.³⁹

The consequences of a spent fuel cask accident involving radioactive material releases are proportional to the quantities of radioactivity released, the estimated health effects of the specific radioactive materials released, and the exposure of individuals or population groups to the materials. Related variables include:

- **The age of the spent fuel.**—Older spent fuel—out of the reactor for 5 or more years—is much cooler than recently discharged fuel both in thermal and radiological terms. If more spent fuel is carried in each cask to reduce the number of necessary trips, the amount of thermal activity in the cask will increase. The radioactivity available for release and the heat available to raise the temperature of the spent fuel

³⁴Philip E. Eggers, *Severe Rail and Truck Accidents: Toward a Definition of Bounding Environments for Transportation Packages*, NUREG/CR3499 (Washington, DC: Nuclear Regulatory Commission, October 1983), p. 69.

³⁵OTA background analysis, June 1985.

³⁶Edward W. Sheperd, *Transportation Technology Center Quick Reference File*, Item TTC/012, SAND79-2101 (Albuquerque, NM: Sandia National Laboratories, May 1981).

³⁷Ibid.

³⁸T. Wolff, *The Transportation of Nuclear Materials*, SAND84-0062 (Albuquerque, NM: Sandia National Laboratories, December 1984).

³⁹U.S. Department of Energy, "Environmental Assessment for a Monitored Retrievable Storage Facility," *Monitored Retrievable Storage Submission to Congress*, vol. 2, RW0035, review copy, unpublished typescript, December 1985, p. 2.23.



Dangerous Goods Newsletter

ISSN 0710-0914

TP 2711E

Vol. 6, No. 3

September 1986

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Transport
Canada

Transports
Canada

Dangerous
Goods

Marchandises
dangereuses

Canada

EXPECTED ANNUAL CONSEQUENCES
FROM LPG TRANSPORT INCIDENTS,
CANADA 1985

	<u>Fatalities</u>	<u>Injuries</u>	<u>Property</u> <u>Damage</u> <u>(\$1985 Cdn)</u>
Rail Tank Cars	0.25	6.5	1,100,000
Highways transports	<u>0.09</u>	<u>0.6</u>	<u>30,000</u>
Total	0.34	7.1	1,130,000

Hence, on average, only 0.34 fatalities are expected annually (or about one every three years), and roughly three-quarters of these are from rail spills. The risk analysis also showed that, while the risks associated with both rail and truck transport of LPG's are extremely small, on a tonne-kilometer basis, truck transport is significantly safer than rail transport.

In carrying out the analysis, a considerable amount of detailed information was gathered on present and future LPG supply and demand trends in Canada, on the logistics of LPG transportation, and on the structure of the Canadian LPG transportation industry. This information is contained in Volumes 2 and 3 of the study report. In addition to the R&D analysis, Volume 1 contains a detailed risk assessment of rail and truck transport of LPG in both Canada and the U.S.

The study report consists of four volumes:

- Summary Report
- Volume 1: Analysis and Results
- Volume 2: LPG Regional Supply and Demand
- Volume 3: LPG Transportation Industry and Forecast Shipments

To obtain copies, contact:

Ms. Jan O'Connor, RDE/X
Transport Canada
Place de Ville, C-21A
Ottawa, Ontario
K1A 0N5

Telephone: (613) 991-6040

There is no charge for any of the reports. In ordering, please specify which volume(s) you would like to receive.

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Quantalytics Inc.
101-2110 W. 43rd. Ave.
Vancouver, B.C.
V6M 2E1

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The Municipality of
Metropolitan Toronto

Metropolitan Clerk's Department

City Hall, Toronto, Ontario, Canada M5H 2N1

Telex: 06-234392-8011

Telephone:



Walter J. Lotto, *Metropolitan Toronto Clerk*
Daniel Crombie, *Deputy Metropolitan Clerk*

October 1, 1986.

Mr. H. Morrison,
Chairman,
Metro Toronto Residents'
Action Committee (M-TRAC),
15 Warren Road,
Toronto, Ontario.
M4V 2R4

Dear Mr. Morrison

I am enclosing for your information and any attention deemed necessary, the appended Clause No. 1 contained in Report No. 11 of The Transportation Committee, which was adopted, without amendment, by the Council of The Municipality of Metropolitan Toronto at its meeting held on September 30, 1986.

Yours truly,

Metropolitan Toronto Clerk.

W.J. Lotto/bg
Encl.

Sent to: Minister of Transportation and Communications
Chairman, Technical Committee of the
Ontario Traffic Conference
Clerk, City of Burlington
Association of Municipalities of Ontario
Chairman, Metro Toronto Residents' Action Committee (M-TRAC)
All Area Clerks

Clause embodied in Report No. 11 of The Transportation Committee, as adopted by the Council of The Municipality of Metropolitan Toronto at its meeting held on September 30, 1986.

I

TRANSPORTATION OF DANGEROUS GOODS.

The Transportation Committee recommends that Council endorse the Position Paper of the Ontario Traffic Conference respecting the Designation of Dangerous Goods Routes in Urban Municipalities, dated April, 1986; and that the Technical Committee of the Ontario Traffic Conference and the Minister of Transportation and Communications, Ontario, be advised accordingly.

The Transportation Committee submits the following report (May 15, 1986) from the Commissioner of Roads and Traffic:

The Transportation Committee on April 28, 1986, had before it a communication (April 17, 1986) from the Metropolitan Toronto Clerk referring back from the Metropolitan Council a communication, which was reported to Council on April 15, 1986, as having been received by the Committee, from the City Clerk and Director of Administration Services, the Corporation of the City of Burlington, forwarding, for information, a resolution enacted by Burlington Council that the Association of Municipalities of Ontario be requested to petition the Ontario Government to reconsider its position on the transportation of hazardous goods, and to enact specific legislation enabling municipalities to control the types of hazardous goods and routes that these goods take within municipal boundaries.

During consideration of the foregoing matter, the Commissioner of Roads and Traffic advised that it is anticipated the question of transporting hazardous goods will be addressed at the upcoming 1986 Annual Conference of the Ontario Traffic Conference.

The Committee decided as follows:

- (a) to request the Commissioner of Roads and Traffic to submit to the Committee information arising from the aforementioned Conference regarding this matter;
- (b) to defer consideration of the aforementioned communication until such time as the said requested information is available;
- (c) to refer a copy of the aforementioned communication to M-TRAC for comment thereon; and
- (d) to request the Secretary of the Committee to notify Controller Trimmer when the matter is to be again considered by the Committee.

Comments:

In response to your Committee's decision in regard to (a) above, I wish to advise that a report respecting the designation of dangerous goods routes in urban municipalities was presented for the consideration of the Ontario Traffic Conference at its annual meeting which took place in Ottawa from May 4 to 7, 1986, inclusive.

This report described the present status of legislation and regulation in both Ontario and other Provinces. It also reported on a number of statistics from Transport Canada in relation to the movement of various dangerous commodities and the mishaps which have occurred.

However, the report also advised that the authors were unable to obtain statistics that would be necessary to demonstrate that the effect of accidents involving trucks carrying dangerous goods has resulted in more deaths, injuries and property damage than other truck collisions. It appears that while many agencies and researchers are assembling such information, or laying the groundwork for complete and comprehensive reporting, the existing information is very fragmented. It appears that more definite information may be available within a few years time, but this is not a certainty.

In view of the lack of evidence to counter the position expressed in a communication from the former Minister of Transportation and Communications of Ontario, which was addressed to the Association of Municipalities of Ontario (dated May 28, 1984) to the effect that the Ontario Government feels that existing legislation providing for the regulation of Heavy Trucks was sufficient to also provide for trucks carrying dangerous goods, the Board of Directors of the Ontario Traffic Conference decided to refer the report to its Technical Committee and the Ministry of Transportation and Communications/Ontario Traffic Conference Committee for further consideration and review.

(Position Paper of the Ontario Traffic Conference respecting the Designation of Dangerous Goods Routes in Urban Municipalities dated April, 1986, which was presented at the Annual Meeting of the Ontario Traffic Conference held from May 4 to 7, 1986.)

Introduction:

In recent years, the public and municipal Councils have been made increasingly aware of the potential for major disasters within municipalities, resulting from the transportation of dangerous goods and materials by road and by rail. This new awareness, fueled by media coverage of events, not only in Canada but on an international scale, has led to the expectation that the flow of dangerous goods through urban municipalities would be regulated in order to minimize the potential for such incidents resulting in the loss of life and property. Indeed, action has been taken in some Provinces and municipalities to establish dangerous goods routes.

Many municipal officials in the Province of Ontario were of the impression that recent activity at the Federal and provincial levels of government was, in part, for the purpose of laying the ground work for the designation and classification of dangerous materials with the objectives not only of creating regulations related to the production, handling, transportation and disposal of dangerous materials, but also for the designation of transportation routes in the Province of Ontario by which such materials could be transported.

It came as a surprise to many municipal officials when former Minister of Transportation and Communications, Ontario, James Snow outlined the Province's stand in a letter to the Association of Municipalities of Ontario dated May 28, 1984, as follows:

"As was stated in the December, 1982, Ontario Government response to the report of the inter-association working group on the transportation of dangerous goods, and again on May 17, 1984, by Mr. (Claude) Bennett, this government cannot agree, at this time, to legislative changes related to routing of dangerous goods vehicles. There is legislation in place which allows for the designation of truck routes within municipalities. To further limit the routing of vehicles carrying specific commodities would unfairly discriminate against that portion of society which has contact with dangerous goods. These commodities are needed and used within municipalities and must be allowed free access to and from local establishments".

The need for deliveries of hazardous goods and materials within urban municipalities is not at issue. It is quite apparent that these materials play a vital role in satisfying real needs and in the quality of life which is enjoyed in urban areas. If there is an issue, it is whether through movements of dangerous materials should and can be restricted to those routes which, by the nature of their location, physical standards, proximity to truck destinations, abutting land uses and connections to provincial highway systems, provide an inherently safer facility for dangerous goods movements.

Status of Dangerous Goods Regulations in Other Provinces and Territories:

A paper presented to the Annual Conference of the Roads and Transportation Association of Canada in Vancouver in 1985, prepared by Mr. F. P. Nix, summarized the current status of regulations respecting the movement of dangerous goods in various Cities and Provinces in Canada.

It was pointed out that the Federal regulations, which were necessary to provide a framework for the classification, handling, placarding and transportation of dangerous goods were not completely in effect until July of 1985, and that this set of regulations was necessary to co-ordinate the corresponding and complimentary regulations at the provincial level. This may be the reason that a number of municipal by-laws in various Provinces were being held for final approval pending the establishment of this necessary framework.

As of September, 1985, a total of five Provinces and/or Territories already allow local governments to control the movement of dangerous goods through their areas, without the requirement of approval by the Province or Territory. These include Newfoundland, Prince Edward Island, Manitoba, Yukon and the Northwest Territories.

A total of six Provinces allow or intend to allow local governments the authority to establish dangerous goods routes, subject to approval by the Province. These include Nova Scotia, New Brunswick, Quebec, Saskatchewan, Alberta and British Columbia.

Only one Province, the Province of Ontario, does not allow or does not currently intend to allow the local government to have this authority.

As of September, 1985, two Cities had dangerous goods routes in place, these being the Cities of Calgary and Edmonton. An additional six Cities had by-laws in place, but did not have the dangerous goods routes in place at that time. This included the Cities of Grand Prairie, Richmond, North Vancouver, Vancouver, Regina and Saskatoon.

Of the by-laws in effect, there were four common threads respecting the various types of regulation specified in the by-law, as follows.

All by-laws specified the routes upon which through movements must take place, with the exception that pick-up and deliveries could be made via the shortest route from the dangerous goods route. Two of the Cities had an absolute ban on some routes except by special permit, but most do not ban movements from any street in the municipality. Five of the Cities prohibit the stopping or parking of vehicles along the dangerous goods routes except by special permit. Five of the Cities have special provisions for the Central Business Districts of Cities.

The summary of Mr. Nix's paper concluded that the number of actual or planned dangerous goods routes is increasing in Canada, and will presumably accelerate now that the Federal regulations have been established.

Relevant Statistics:

There are many papers and publications available, which have been developed by Federal, provincial, State and private agencies and researchers respecting the movement of dangerous goods in Canada and the United States. However, at the present time, a co-ordinated and consistent reporting format is lacking in both Canada and the United States. The first requirement was the establishment of Federal and provincial regulations for the classification and regulation of dangerous materials, and current activities at the Federal and provincial levels will assure that a comprehensive and co-ordinated and complete reporting system will be in place in the near future. Transport Canada is preparing a centralized accident data collection mechanism which will co-ordinate all of these activities within a prescribed reporting format. For these reasons, the presently available information is uncoordinated and incomplete, but a number of statistics are available from various sources which are relevant to the issue.

Transport Canada - "Dangerous Goods Occurrences 1981-1983"

- 59 per cent. of all reported occurrences occur on roadways;
- 58 per cent. of all reports involve flammable liquids;
- 59 per cent. of dangerous goods are transported in bulk;
- 42 per cent. of reported occurrences occur in rural areas; 36 per cent. occur in industrial areas; 13 per cent. occur in business/commercial areas;
- 56 per cent. of all reported occurrences occur in transit of which 76 per cent. occur in road transit; 18 per cent. occur in rail transit; four per cent. occur in marine transit; two per cent. occur in air transit;
- 58 per cent. of occurrences involve flammable liquids; 11 per cent. involve gases; 11 per cent. involve corrosives; eight per cent. involve poisonous substances;
- 93 per cent. of all incidents reported involve a spill or a leak and in 43 per cent. of all cases, significant quantities were spilled or leaked such that containment was difficult; and
- Transport Canada will be concentrating on cost data in order that the actual cost of dangerous goods incidents can be determined.

Ontario Ministry of the Environment - "Annual Spill Report Summary - 1983 and 1984"

- In 1983 the Ministry of the Environment received 592 reports of incidents involving dangerous goods, and estimates that as many again are reported to other agencies. Of the 593 incidents, 301 involved oil substances, 95 involved other hazardous liquids and solids, 29 involved gaseous materials, and 167 involved other weaker pollutants.
- Of the 592 incidents reported to the Ministry, 29 involved the collision of motor vehicles and 35 involved the overturn of the transporting vehicle.
- Of the total number of incidents reported, 32 per cent. were transportation related, 33 per cent. occurred in plants and factories, 22 per cent. occurred in storage facilities and 13 per cent. occurred at other locations.
- Liquid spills from tank trucks in transit included sulfuric acid, hydrochloric acid, hydrofluoric acid, phosphoric acid, muriatic acid, acidic acid, gasoline, fuel oil, naphtha, toluene, benzene, hexane, solvents, paint, weed killers and fertilizer.

American Department of Transport

- It is estimated that at least four billion tons of hazardous goods are shipped each year in the United States.
- It is estimated that hazardous goods are carried at least 218 billion ton miles annually in the United States.
- A survey indicated that 17 per cent. of all trucks crossing the Mississippi River carry dangerous goods.

The Insurance Institute for Highway Safety (U.S.) - "Big Trucks"

- The Bureau of Motor Carrier Safety reports that crashes involving hazardous goods result in 22 per cent. more fatalities and 61 per cent. more property damage than other truck crashes.

Ontario Ministry of Transportation and Communications - "Ontario Commercial Vehicle Survey - 1983"

- At selected survey locations on King's Highways in Ontario, the percentage of trucks carrying dangerous goods range from 2.7 per cent. to 21.0 per cent. The average figure for all of the locations surveyed was 8.1 per cent. In terms of tonnage carried, dangerous goods were found to comprise 12.3 per cent. of all goods movements.
- At international border crossings, the percentage of trucks carrying dangerous goods was found to range from 1.6 per cent. to 46.5 per cent.
- At interprovincial border crossings, the percentage of trucks carrying dangerous goods ranged from 6.2 per cent. to 12.0 per cent.
- The destinations of dangerous goods were found to be 28 per cent. to manufacturing establishments, 16 per cent. to warehouses, 15 per cent. to retail outlets and 13 per cent. to distribution centres.

Special Concerns in Urban Municipalities:

The special conditions existing in urban areas result in special concern respecting the storage, handling, use and transportation of dangerous goods within these areas. The concerns are related primarily to the concentration of people and real estate development in areas immediately adjacent to transportation arteries.

One aspect of the concerns is the concentration of people at certain locations within the municipality.

Central business districts have high density, multi-story buildings which are occupied by office workers and shoppers during normal hours. The evacuation of such areas, in the event of an emergency, would take a considerable length of time because of the sheer volume of people and the relative distance to the various transportation facilities and modes upon which accessibility to these areas depends. While larger Cities may be structured such that large loads of dangerous goods might avoid the central business district because their destination is not in the area, and preferred routes by-pass the area, this is frequently not so in smaller Cities and Towns in which the principal highway routes run through the heart of the municipality and alternative routes, if available at all, may be perceived by truckers as being less attractive.

Hospitals have populations of people who cannot all respond to an emergency situation without assistance, and the evacuation of a hospital is an extremely complex, time consuming and perhaps life-threatening exercise.

Schools, with their concentrations of children, result in a very special type of concern.

Subway systems of public transit are particularly susceptible to liquid or gaseous materials which might enter the system from above in the event of vehicle collisions, and present special problems in the dispersal of such materials and in the evacuation of people. These special problems also apply in tunnels carrying vehicular traffic including hazardous goods and materials.

Another concern in urban areas is the sheer level of vehicular traffic, which frequently results in severely congested conditions under normal circumstances, and a high potential for vehicular collisions. It is a matter of record that the vehicle collision rate on congested urban streets is three to five times as high as on freeway standard facilities.

All of these factors contribute to a high level of concern, at the municipal level, about the routing of hazardous goods in urban areas.

Characteristics of Various Road Designs:

Typical urban arterial streets have certain common design features and characteristics which are particularly relevant to the movement of vehicular traffic, and in particular, to the movement of large heavy vehicles.

A very important characteristic of urban arterial streets is that they are normally operated by traffic signals controlling major crossing movements at frequent locations along the route. This results in a stop and go type of operation which can be a costly nuisance to automobile traffic, and a severe impediment to the movement of heavy vehicles. While automobiles have a favourable power to weight ratio which results in relatively effective acceleration and deceleration characteristics, large trucks do not have these capabilities. A signal system which is timed for efficient automobile operation often causes severe problems for large vehicles, which cannot readily accommodate themselves to the somewhat erratic operation required by this type of control system. One result of these conditions is that truck movements are generally much slower in urban areas than automobile movements. Another result is the relatively high collision rate which has previously been referred to.

Another important characteristic of urban arterial streets is the frequent crossings of the streets by motorists and pedestrians, which creates the potential for collisions, and which aggravates the stop and go problem.

The presence of parked cars, loading trucks and stopped buses and other types of activity also inhibit smooth traffic flows on arterial streets.

Another major factor is the unforgiving environment adjacent to the travelled portion of the roadway in urban areas. The boulevard areas are occupied by utility poles, fire hydrants, pedestrians, sign posts, vehicles parked in driveways and a host of other permanent and portable encumbrances, which may be struck by a vehicle which deviates even slightly from the travelled roadway, whether as the result of a minor loss of control or as a secondary result of a vehicle collision on the roadway.

In many instances, the narrow lane width and the superelevation of the curb lane of arterial streets causes large vehicles to shy away from poles located immediately adjacent to the edge of the pavement, and from the catch basins and intersection superelevation transitions which may make the outer edge of the curb lane very rough. This frequently forces the large vehicle to intrude into the adjacent lane, with resulting accident hazard and erratic traffic movements.

Arterial streets are frequently intersected by at-grade railway crossings which present the possibility of truck-train collisions which are particularly hazardous when incompatible dangerous goods are being carried on both the truck and the train, and come into contact with each other.

A further important characteristic of arterial streets is that frequently, because of narrow rights-of-way, residential, commercial, institutional and other building structures are often constructed within ten feet of the travelled portion of the roadway. Out of control vehicles frequently strike buildings where people work, do business, eat and sleep, and these people are particularly vulnerable to the effects of hazardous goods spills, explosions or fires which might occur.

Freeway facilities offer the other extreme of operational characteristics, and may be contrasted with normal arterial facilities in the following respects:

- The collision rates are much lower.
- Traffic operates normally under free flow rather than stop and go operation.

- There are no crossing pedestrians or vehicles to interrupt free-flow operation.
- There are no parked or loading vehicles on the travelled portion of the roadway.
- Poles, posts and other encumbrances are either non-existent, located away from the edge of the roadway or protected.
- Lane widths are always adequate.
- There are no at-grade intersections or railway crossings.
- There is normally a wide paved shoulder which is an escape area useful to help the motorist avoid incidents on the travelled portion of the road.
- The shoulders are generally sloped such that an out-of-control vehicle can often leave the roadway without undue hazard.
- There are no building structures immediately adjacent to the roadway, and no people working or living at exposed locations adjacent to the roadway.
- The right-of-way is frequently wide enough to permit a hazardous goods event, such as a fire, to occur in this area without endangering other property or human life.

While there are many roadways with design and development characteristics in the middle of the range between the arterial street and the freeway, the foregoing discussion is merely to support the conclusion that there are decidedly preferred routes in urban areas for the movement of dangerous goods through municipalities.

Different Characteristics of Various Municipalities:

The need for and the applicability of restricted routing of dangerous goods movements is quite variable in different municipalities.

One extreme in the types of urbanized area is the small development along a provincial highway in which the highway is the main street and a limited amount of development exists primarily along the main street. Such areas have low populations and low densities. Normally, such areas have little or no industrial development, and, therefore, deliveries of dangerous goods to these municipalities are negligible. Thus, virtually all dangerous goods movements are through movements on the main street. Typically, there is no reasonable route alternative to the main street, and re-routing of dangerous goods would not be realistic or reasonable.

In some cases, a highway by-pass may be under consideration for the purpose of re-routing most through traffic away from the main street. If and when such a by-pass becomes a reality, it is likely that a re-routing of dangerous goods movements should be legislated in this type of situation, but in many cases, such an alternate route is not likely to be constructed, and re-routing of dangerous goods may never become a realistic possibility.

The other extreme of type of municipality is the large City, with an extensive network of major road facilities ranging from arterial streets to freeway calibre facilities. Such Cities may have structured development plans which isolate industrial areas in which dangerous goods are produced or utilized from business, institutional and residential districts. Such Cities may have well planned expressway and freeway facilities which are planned, among

other things, to provide direct and convenient access to industrial areas. In Cities of this type, most dangerous goods movements may be occurring on those roadway facilities which are best suited to such movements by virtue of their right-of-way width, design characteristics and abutting land uses. In this type of situation, the need for regulation of dangerous goods movements may be marginal.

The most typical situation is that of a medium sized Town or City which may be served by several provincial highway facilities, and may have a system of regularly spaced arterial routes which offer alternative routes for the through movement and delivery of dangerous goods. Industrial land uses may be concentrated in one area or may be dispersed throughout the municipality. Population, commercial and employment densities may be quite variable in different areas of the municipality. Thus, in this more typical municipal configuration, there may be many distinct possibilities for the regulation of hazardous goods movements in the best interest of the various segments of the public which are directly affected.

Thus, the need for and applicability of regulations respecting the through movement and delivery of dangerous goods is unique for every urban municipality.

Accessibility - The Permissive System:

The thrust of this discussion is the regulation of dangerous goods movements - not the prohibition of dangerous goods movements. As was stated by the former Minister of Transportation and Communications, Ontario, James Snow, "These commodities are needed and used within municipalities and must be allowed free access to and from local establishments"

The intended result of allowing the continued movement and delivery of dangerous goods can only be achieved by a "permissive" rather than a "prohibitive" approach to the problem.

The "permissive" approach is used in the existing truck route regulations in effect in many municipalities in Canada. This approach provides that movements and deliveries may be made at any time of the day to any destination, but that the routing of the movements is regulated. The general rule for normal truck route systems is that the movement may deviate from the prescribed truck route system, but only to the extent of using the shortest reasonable distance from the truck route system via local (non-truck route) streets. The permissive dangerous goods regulations would merely be a refinement of "permissive" truck route regulations. Thus, in most or all cases, dangerous goods routes would be a portion of the permissive truck route system in the municipality. In many instances, as was implied in The Honourable James Snow's statement, the dangerous goods routing system and the truck route system would be one and the same, although there would likely be exceptions to this general rule in most municipalities.

Just as some truck route systems have sections which apply only during daylight hours (such as from 7:00 a.m. to 7:00 p.m.), dangerous goods movements could be limited on some sections to certain hours of the day if appropriate. However, it is anticipated that most or all sections should be operated on a 24 hour basis.

Thus, the result of the "permissive" system of dangerous goods movement would be to allow movements and deliveries to all premises at all hours of the day, via routes which could but would not normally change at various times of the day.

Need for Provincial Overview:

Just as there is a need for co-ordination among the Provinces in the provision of a highway network which crosses provincial boundaries and provides a comprehensive and continuous transportation network on a national basis, there is a need for the Province to protect the integrity and continuity of the provincial highway system into and through municipalities. There may be cases where the requirements of the provincial highway network are at odds with the real or perceived interests of municipalities, and in such cases, the fundamental requirements of the higher level in the hierarchy of transportation systems should be served. To do less would be to endanger the economic and social well-being of the Province and all of its corporate and private citizens.

The same reasoning applies to the designation of dangerous goods routes through municipalities, since many of these are inter-provincial and of the utmost economic importance. Therefore, it would be reasonable and perhaps essential that dangerous goods routes legislation provide for a mandatory approval, by the Province, of municipal by-laws.

Position of the Ontario Traffic Conference:

Whereas the Federal legislation respecting the classification, handling and transport of dangerous goods is now in place;

Whereas the public and municipal officials are vitally concerned with the movement of dangerous goods through urban municipalities;

Whereas Ontario is the only Province or Territory in Canada which does not permit or does not intend to permit municipalities to establish dangerous goods routes within the municipality;

Whereas a very significant percentage of trucking movements within municipalities involve the transportation of dangerous goods;

Whereas there are special concerns within urban municipalities related to the concentration and location of persons and private property in the immediate proximity of the street system;

Whereas some roadway designs and characteristics offer inherently safer conditions for the movement of dangerous goods than others;

Whereas it is recognized that the free movement of dangerous goods cannot be prohibited but can and should be regulated; and

Whereas it is recognized that the transportation of dangerous goods is an essential and vital activity between Countries and Provinces as well as within urban municipalities, such that the provincial government must provide an overview and a means of maintaining continuity of the highway system insofar as the movement of dangerous goods is concerned.

It is, therefore, the position of the Ontario Traffic Conference that:

- (1) the provincial government should confer upon municipalities the power to designate dangerous goods routes through and around the municipality on the basis of a permissive system which regulates but does not prohibit the movement of dangerous goods to any area within the municipality; and

- (2) the Province should retain the power to establish guidelines and to approve municipal by-laws respecting the designation of dangerous goods routes within municipalities.

The Transportation Committee also submits the following communication (April 17, 1986) from the Metropolitan Toronto Clerk:

The Transportation Committee reported for the information of Council on April 15, 1986, having received a communication from the Clerk and Director of Administrative Services, City of Burlington, advising of a resolution enacted by the Burlington Council regarding the transportation of hazardous goods within municipal boundaries.

The Council directed that the foregoing communication be referred back to the Transportation Committee for consideration.

(Communication (March 11, 1986) from the Clerk and Director of Administrative Services, City of Burlington.)

Please be advised that the Council of The Corporation of the City of Burlington at its regular meeting held on March 10, 1986, enacted the following resolution being Item No. PW-62-86:

"WHEREAS municipalities should have a say over the types of hazardous goods transported within its boundaries and in which areas and on which road the transportation of these hazardous goods takes place, and

WHEREAS it is recognized that the provincial Government can develop legislation which would ensure that the transportation of hazardous goods could not be totally prohibited or restricted within a municipality, and

WHEREAS the establishing of routes for the transportation of hazardous goods would be consistent with the approach other provincial Governments within Canada have taken, and

WHEREAS The Corporation of the City of Burlington has regard for the safety of its residents, as well as the residents of other municipalities within Ontario,

NOW THEREFORE BE IT RESOLVED THAT the Association of Municipalities of Ontario be requested to petition the Ontario Government to reconsider its position on the transportation of hazardous goods, and to enact specific legislation enabling municipalities to control the types of hazardous goods and routes that these goods take within municipal boundaries;

and that this resolution be forwarded to all Ontario municipalities having a population over 50,000 for their information."

This is for your information.

The Transportation Committee also submits the following communication (June 16, 1986) from Mr. H. Morrison, Chairman, Metro Toronto Residents' Action Committee (M-TRAC):

The M-TRAC Directors, in response to your communication of May 27, 1986, have given consideration to the issue of the transport of hazardous goods by truck in high-density urban areas, and submit the following:

- (1) Because of downtown congestion and other high-density problems, Metropolitan Toronto faces a unique difficulty in evacuation in the event of a serious chemical spill.
- (2) While this problem is more realistically related to rail transport, risks associated with the movement of hazardous goods by truck cannot be ignored. It would be advantageous to the municipal government and to the people of Metropolitan Toronto to obtain authority to impose constraints on such movement where necessary.
- (3) The right of free access need not be infringed, provided trucks abide by restricted approach routes and times of travel, avoiding busy traffic periods.
- (4) Where practicable, the name of the hazardous product should be clearly stencilled on the container and an orange band should be painted vertically or horizontally around the container to assist emergency response forces.
- (5) The operator of such a vehicle must be fully aware of the nature of the contents of the cargo; the likely consequences in the event of a spill; and the manner in which he should sound an alarm and summon emergency assistance.
- (6) Metropolitan Toronto authorities should have the right to block the movement of such cargo within Metropolitan Toronto confines where periodic monitoring discloses that ordinances have been breached.
- (7) Restricted routes should be clearly marked using the word "Restricted" rather than "Dangerous" to avoid local alarm. Where entry to a congested area cannot be avoided, times of travel for "Restricted" cargo should be clearly posted.
- (8) Heavy penalties should be imposed on truckers hauling hazardous goods above speed limitations.
- (9) The Metropolitan Toronto Emergency Response Co-Ordinator should be given full notice of movement of special dangerous products by truck through the "Restricted" routes. He should have the power to block such movement if he finds the risk is too high.
- (10) The Province should be made aware of Metropolitan Toronto's needs. Protection of Metropolitan Toronto's population must take precedence in the movement of dangerous goods.
- (11) The position paper of the Ontario Traffic Conference dated April, 1986, is to be commended.

The Transportation Committee reports for the information of Council that Controller J. Trimmer, City of Scarborough, and a Member of the Metropolitan Council, appeared before the Committee in connection with the foregoing matter.

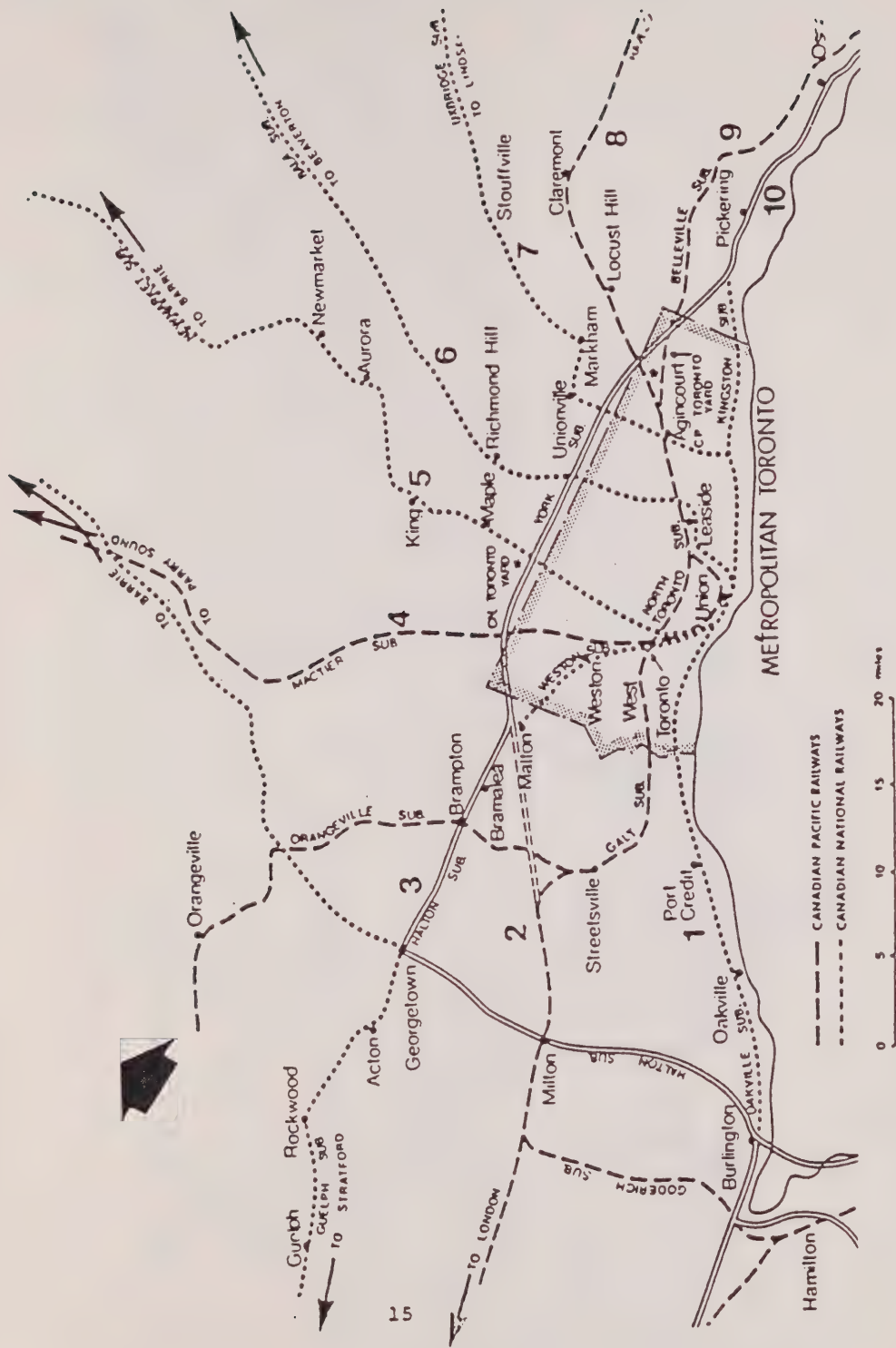


ACCIDENT EXPOSURE

VOLUME 1

TORONTO SCHOOLS

APRIL 18, 1986



**MAP 1
MAIN RAIL LINES
TORONTO AREA**

MAP 2 METRO TORONTO



SMITHS FALLS DIV.

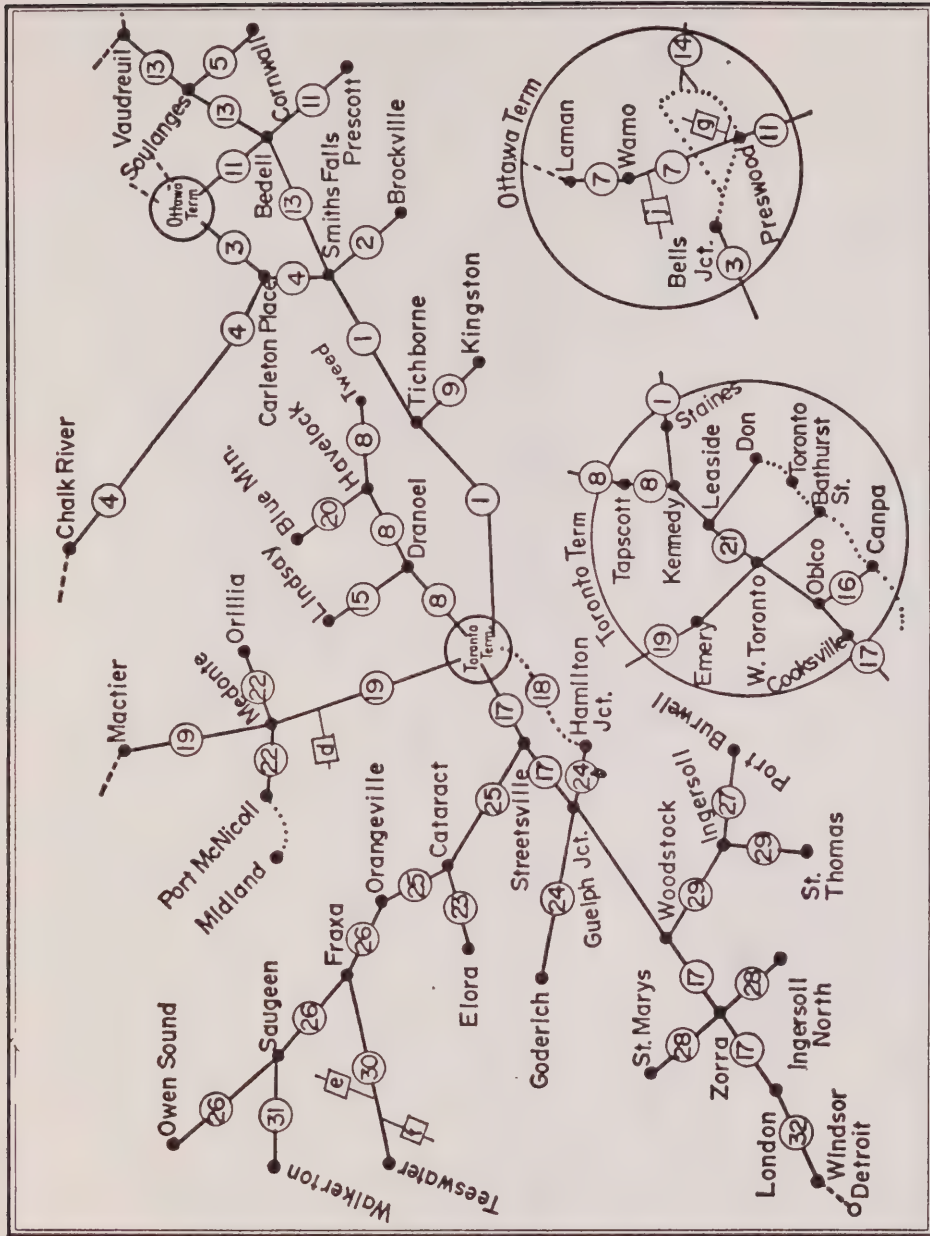
- Ref. Subdivision
 No. 1 Belleville (Smiths Falls to mileage 172.8)
 2 Brockville
 3 Carleton Place
 4 Chalk River
 5 Cornwall
 7 Ellwood
 9 Kingston
 11 Prescott
 13 Winchester (Mileage 20.0 to Smiths Falls)
 14 M & O (Mileage 82.5 to mileage 85.4)

TORONTO DIV.

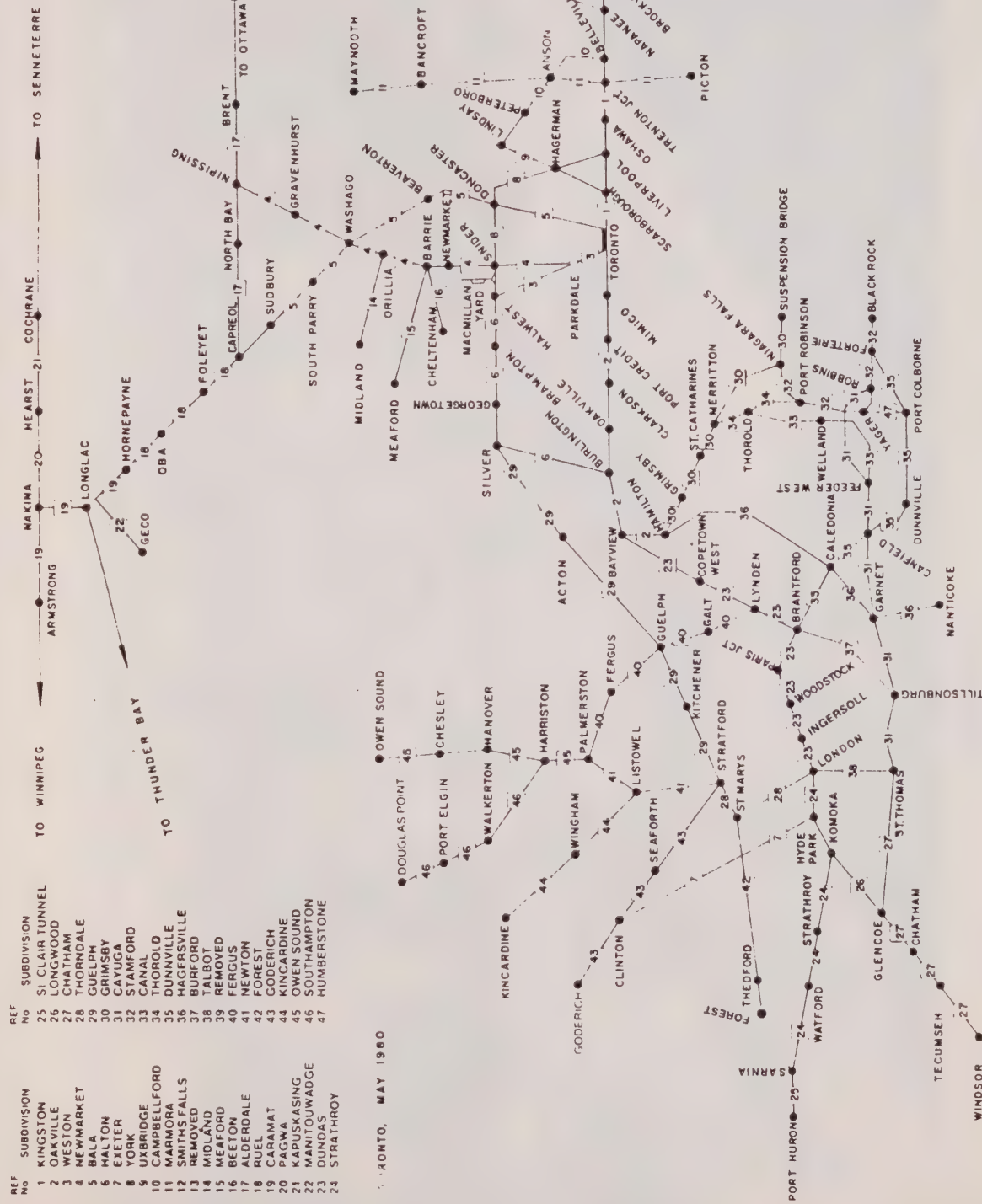
- Ref. Subdivision
 No. 1 Belleville (Mileage 172.8 to Toronto)
 8 Havelock
 15 Bobcaygeon
 16 Canpa
 17 Galt (Tecumseh St. to mileage 15.0)
 18 Hamilton (Bathurst St. to Main St.)
 19 Mactier
 20 Naphton
 21 North Toronto
 22 Port McNicoll

LONDON DIV.

- Ref. Subdivision
 No. 17 Galt (Mileage 15.0 to London)
 23 Elora
 24 Goderich
 25 Orangeville
 26 Owen Sound
 27 Port Burwell
 28 St. Marys
 29 St. Thomas
 30 Teeswater
 31 Walkerton
 32 Windsor



MAP 3
C.P. RAIL ROUTES

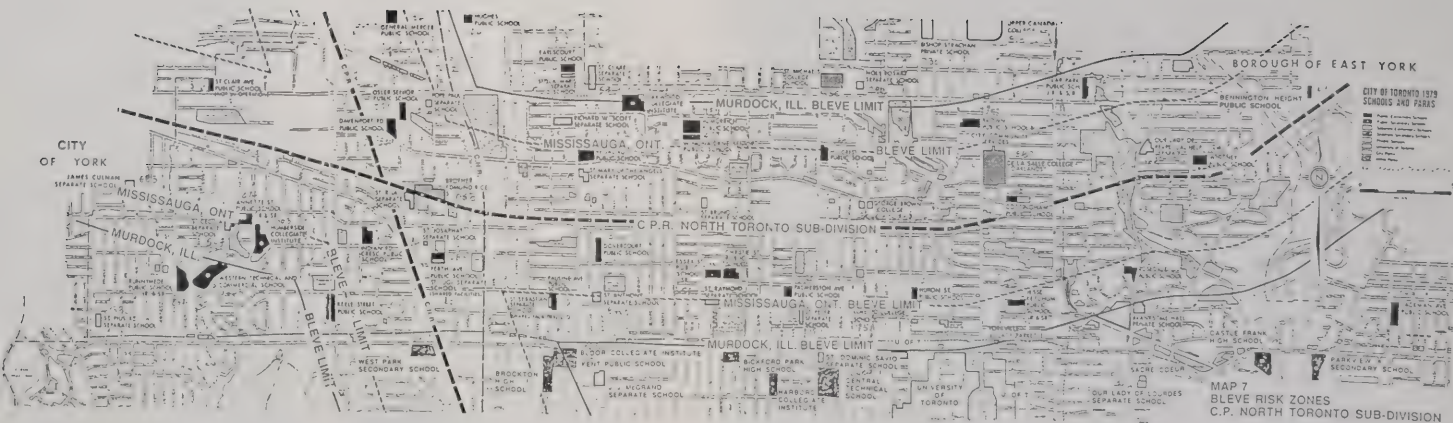


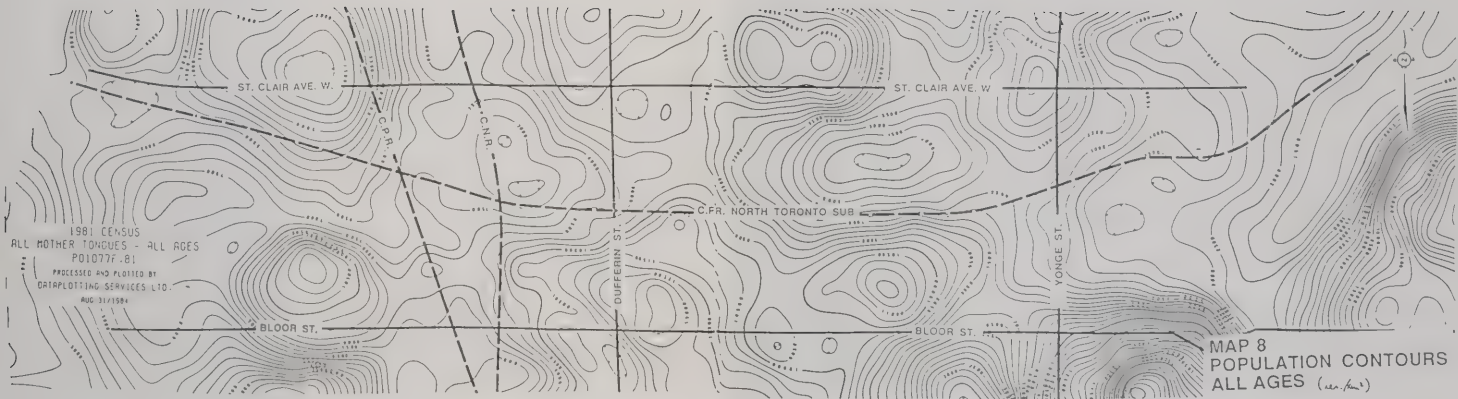
CITY OF TORONTO 1979 SCHOOLS AND PARKS

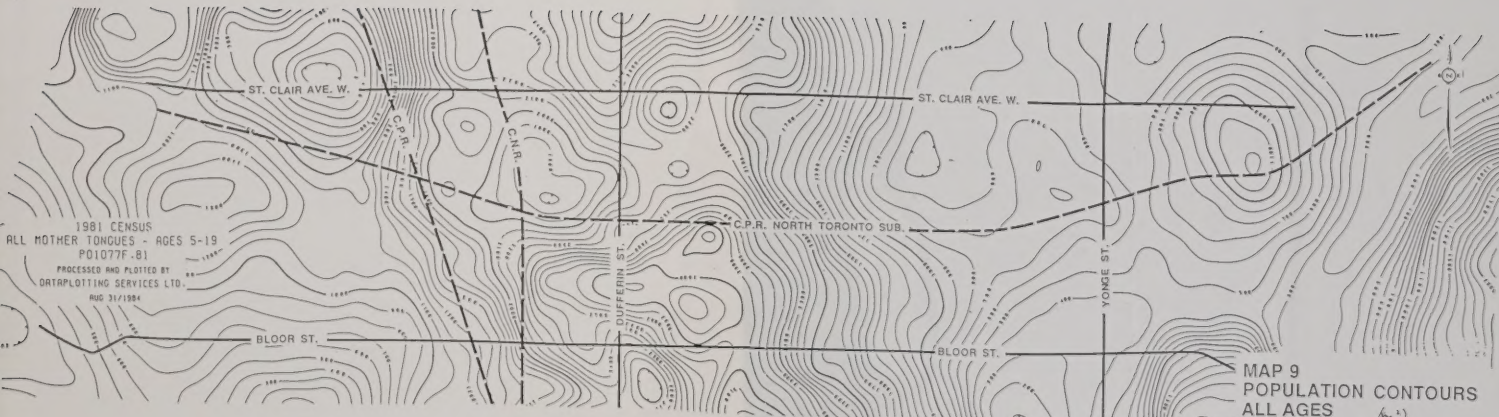
- Public Elementary Schools
- Public Secondary Schools
- Separate Elementary Schools
- Separate Secondary Schools
- Private Schools
- University of Toronto
- City Parks
- Metro Parks



MAP 6 CITY OF TORONTO 1979 SCHOOLS AND PARKS







1981 CENSUS
ALL MOTHER TONGUES - AGES 5-19
PD1077F.81
PROCESSED AND PLOTTED BY
DATAPLOTTING SERVICES LTD.
AUG 31/1984

MAP 9
POPULATION CONTOURS
ALL AGES
(km²)

